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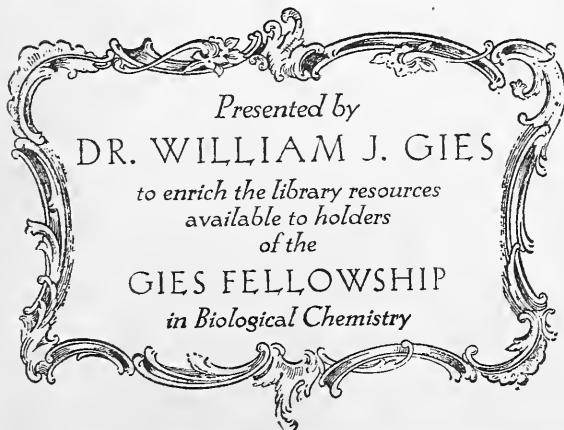
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CARE OF THE MOUTH AND TEETH

A PRIMER OF ORAL HYGIENE

BY

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PREFACE

PERHAPS it is superfluous to state that this brief volume aims at nothing else than the grasping of the fundamental idea of the value of oral hygiene. In attempting to collect a suitable appropriation of ideas for the general reader, both child and adult, it is somewhat difficult, as anyone with similar experience knows, to write for their understanding without entangling oneself in the meshes of at least some technical details, and, as in the case of oral prophylaxis, difficult to avoid disputed ground, especially in regard to therapeutics. So it was with these snares in mind that I have tried to make the scientific matter as simple as possible and the practical advice as nearly correct as the majority of the authoritative opinions of the dental profession would warrant, it having been my idea to leave untouched any point of unsettled value, especially in regard to the late theories of Pickerill and Gies concerning the use of organic acids rather than alkaline fluids. I have written in a positive manner upon the opportunity for general disease resulting from a

primary dental source of infection, which fact is now generally conceded by both the dental and medical profession. Above all I have tried to impress upon the reader the constant necessity of professional co-operation.

In the preparation of the manuscript I have had occasion, of course, to refer to other books and to numerous writers on the subject in various journals, to all of whom I acknowledge my indebtedness, and during the course of which work I was assisted by my wife. The photographs I have duly accredited and the drawings have been purposely made as simple as possible by myself.

If the résumé following of oral hygiene is as useful as the cause for which it was written is good, I am sure this little volume will find no few friends.

JOSEPH H. KAUFFMANN.

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CARE OF THE MOUTH AND TEETH

CHAPTER I

WHY WE ARE ESPECIALLY INTERESTED IN THE MOUTH AND TEETH

THE chief purpose of this book is to tell in a simple manner how and why we should faithfully preserve the healthful condition of the mouth and teeth and so help to perfect ourselves physically, mentally and morally.

We will do this by explaining as the names of the chapters indicate:

First: Why we are especially interested in the mouth and teeth.

Second: The relationship of the oral cavity to the rest of the body.

Third: The structure and functions of the mouth and teeth in particular.

Fourth: Results of neglecting the cleanliness of the oral cavity.

Fifth: Measures of oral hygiene or how to keep healthy the mouth and teeth.

Sixth: Beneficial results of oral hygiene.

During the course of these chapters we shall discuss many points of interest which will serve as stepping-stones in impressing upon our minds the chief purpose, as first stated, of this book.

The proper and scientific name for the mouth is the oral cavity, which brings us to the subject of our book, or oral hygiene.

Oral hygiene is that study which enables us to learn how to better preserve our health and guard against disease by faithfully using all the ways and means at our command which will keep the mouth and teeth in healthful condition.

It is always our earnest desire to be healthy, both for our own sakes and for the good of those about us. In the past it has been the fashion to speak chiefly about curing disease, but now we speak a good deal more about preventing disease, and it is being proved more and more that "an ounce of prevention is worth a pound of cure." We first learn to take bodily care of ourselves by instinct or natural intuition when we are mere infants. When a baby first learns to walk he takes hold of the corner of a chair so as to support himself, knowing that to fall would hurt him. And so this instinct develops gradually in such

a way that besides natural inclinations we observe all the safeguards to health which we are taught; for instance, in trying to obtain proper and sufficient food, in proper clothing, in obtaining sufficient exercise and rest, in bodily cleanliness, in avoiding dangerous occupations or unsafe surroundings, in having ourselves vaccinated so as to prevent disease such as smallpox and in numerous other ways of which these serve as examples. But to-day we have advanced still further in that we not alone use all those means that are usually carried out of preserving our bodies in general, but we also take a particular interest in another important factor of health, namely, the cleanliness of the mouth and teeth or oral hygiene. This is because through past experience we realize what important functions our mouths and teeth serve; we realize how closely related they are to the welfare of the rest of the body; what serious conditions can arise from their neglect; how we can avoid these conditions by observing the elementary principles of cleanliness and what benefits may arise in doing so. Throughout the world this spirit of oral hygiene has grasped people of all ages and races, although up to this time we have gone along without paying enough attention to the very entrance,

as it were, of the body. Due to the fact that our parents, teachers, and medical advisers have always faithfully endeavored to help us as children become healthy and useful men and women, we have made great strides; but how much more good will be done in future years and how much more war will be waged against disease by the practise of oral hygiene! Like all other campaigns in the cause of health and prevention of disease, this one of oral hygiene will bring us to a still greater degree of physical and hence mental and moral perfection, because the healthier our bodies the sounder our minds and the finer our ideals! And as the engineer, chemist, electrician, educator, statesman, physician, and scientist of every turning each has his opportunity to forward civilization in its wonderful march toward perfection, so to-day has the dentist, upon whom the perfection of this great movement rests, the opportunity to serve as a helpful factor in the benevolence of mankind and the improvement of the human race.

CHAPTER II

THE RELATIONSHIP OF THE ORAL CAVITY TO THE REST OF THE BODY

LET us consider for a moment the body as a whole. We first refer to its general construction, or what is termed anatomy. We next speak of the functions of the various parts constituting the body, or our physiology. And if we were further interested, as some of us will perhaps be, we might examine the finer tissues of the body very minutely under the microscope, this study being called histology. In doing so we would discover little cells making up our various tissues, which forming the basis of our bodies are called elementary units of living matter, and when many cells of one kind are grouped together the result is a tissue. But for our present purpose we need only gather a few simple facts concerning our anatomy and leave further study of these structures for another time and place.

We all know the body is built upon a bony framework, over which are laid various tissues and organs that serve us in so many useful ways. These structures are closely related to each other

and for purposes of study are divided into groups, and the first of these groups to interest us is the digestive apparatus, or organs of digestion.

The alimentary or digestive canal is a long tube about thirty feet in length, lined by a soft tissue called mucous membrane, which is similar in purpose to the skin that covers the body without. The principal organs of this apparatus are the mouth, pharynx, œsophagus, stomach, small and large intestines, and these are assisted in their work by the teeth, salivary glands, liver, pancreas and spleen, which are called accessory organs of digestion.

Let us see the path the food takes in its passage through the digestive canal. The lips, two in number, serve as the entrance to the mouth and lead into the interior of the oral cavity, which we will describe in detail later. We next pass into the upper part of the throat or pharynx and descend into a long tube called the œsophagus, which leads into the largest organ of digestion, the stomach. From the stomach we pass into the small intestines, with which the liver, spleen and pancreas communicate to assist in the preparation of the food for its use by the body tissues. Here most of the food after being prepared is taken up

for use by the tissues of the body and a smaller amount passes into the large intestines, where a little more is taken up and the remainder, or waste, chiefly solid matter, is thrown off. Although we will not go into details covering the functions of these parts, it is best that we have glanced over all of those organs having something to do in the task of digestion.

Besides a brief knowledge of these organs, it is important to know how they communicate with each other and indirectly with all the other cells of the body.

Nutrition, or the feeding of the body, is carried on by two sets of organs, called the blood vessels and lymphatics, which contain two fluids essential to life, called blood and lymph.

The blood vessel system originates in the heart, which is the pumping station for the supply of blood to all the tissues of the body, no matter how small they may be. This it does by means of tube-like structures called arteries, capillaries and veins. The arteries and capillaries carry chiefly nutritional substances, while the veins take up chiefly the waste matter and poisonous gases from the tissue cells. But the blood does not have its choice of selecting one particular place in which to store

up food, but passes through every part of the body after it leaves the heart, and before it returns, thus making what is termed a complete circuit of the body cells. So that when it bathes the cells of the oral cavity, it goes back to the heart, thence to the lungs to be refreshed with pure oxygen and give off its principal waste or poisonous gas called carbon dioxide, after which it returns again to the heart, is sent through the digestive organs for food material, and finally returns in a freshened state to supply the oral cavity from whence we started. We thus see that our mouths have relationship with many other parts of the body, because of the connecting agent or blood.

We mentioned before the lymph system. This resembles the blood vessel system in that it follows the blood vessels all over the body and assists them by carrying through little tubes, called lymphatics, food from the small blood vessels to the cells and waste from the cells into the small veins, besides which, by means of vessels in the digestive tract, called lacteals, it distributes fatty substances collected from the intestines to the blood for use by the tissue cells. As it helps to bring blood and tissue cells into communication, it is called the "middleman" of the body.

We should also consider an important set of structures called nerves. The nervous system comprises the brain, spinal cord, and their messengers called nerves, which latter, when large, are like threads and when small like very fine fibres. These when acting with one another serve several purposes.

Firstly—To warn us of danger by causing the sensation of pain; for instance, in toothache.

Secondly—To help move our bodies and secure all voluntary movements, as, for instance, chewing food, by means of messages sent from the brain along the nerves connected with the muscles, by whose contraction the desired movements of the jaw take place.

Thirdly—By conducting messages from one part of the body to another, thus keeping our organs in sympathy with one another for their mutual benefit; for instance, in eating dry food we immediately notice our mouths fill with saliva of a watery quality, thus making it easier for the food to be masticated so as to be better digested. Thus the salivary glands assist the digestive organs in their work, although the action is undesired in our minds or involuntary.

We have also to consider our respiratory appa-

ratus, whose parts assist in the interchange of gases between the body and the atmosphere in which we breathe and which communicates with the oral cavity. Air is first breathed in through the nose, whence it finds its way by means of passages through the nose into the pharynx, which is continuous with the larynx or vocal organ. It then continues into the trachea, hence to spreading tube-like structures called bronchioles, after which it enters the lungs or chief organs of respiration. Here the blood gives up its carbon dioxide to, and takes up fresh oxygen from, the air we breathe.

Finally, we might mention the kidneys, where the blood is drained of its liquid waste, which is later thrown off in order to relieve the tissues of undesired matter. We now understand that the kidneys, lungs, and the intestines, in purifying the blood, have indirectly received the waste of the oral cavity.

We have thus briefly reviewed for one important reason many factors of health, all of which are related to the oral cavity, and hence with our teeth. Not because we are studying these organs by themselves, but for the very fact that we wish to show their relationship to the mouth and teeth.

And as the oral cavity is constantly in communication by means of lymph and blood with every other part of the body, it is important that its contents, particularly the teeth, be in as healthful a state as possible so as to uphold the health of the rest of the body; for if not so, the blood, which passes through its tissues, communicating with the teeth, will serve as a source of danger to all the other parts with which, as we have seen, it must necessarily come in contact. Not only this, but when we realize that all the food we partake of goes firstly through the oral cavity, when we realize the relationship of the mouth with the air we breathe, we can see that it is indeed a most important protector of our internal welfare; and when we study its important functions, especially those of the teeth, we can appreciate the vital importance of oral hygiene, which not alone conserves the health of the mouth and teeth, but prevents many undesired conditions amongst which number numerous diseases; all of which we shall presently speak of, after becoming more intimate with the immediate subject of our book, the structure and functions of the mouth and teeth themselves.

CHAPTER III

THE STRUCTURE AND FUNCTIONS OF THE MOUTH AND TEETH

THE chief points of interest in this book lie in the oral cavity, and those members of the oral cavity which deserve our most constant attention are the teeth.

The oral cavity has the form of a hollow oval-shaped space, bounded in front by the lips, on the sides by the cheeks, below by the floor of the mouth or muscular tissue and under surface of the tongue, above by the hard and soft palate, and behind by the entrance to the throat or the fauces.

Within the cavity of the mouth we find the tongue, which aids us in mastication, deglutition or swallowing, speech and taste.

Situated within the mucous membrane, or protective lining of the cheeks and floor of the mouth, are the salivary glands, which number three on each side, and which secrete a watery fluid called saliva, that is always present bathing the tissues. These are assisted by smaller glands, which are

situated at various places in the mucous membrane throughout the mouth. The functions of the saliva are manifold.

Firstly—It assists digestion by means of a ferment which it contains, called ptyalin. This converts starchy and complex sugary foods into a simple sugar called glucose.

Secondly—It moistens the food and thus makes it easier to chew.

Thirdly—It moistens the oral cavity, making it easier for the food to be passed about from one part to another during mastication, and at the same time helps the free movement of the tongue.

Fourthly—It removes the food from the folds of the cheeks and lips, thus preventing its collection and decomposition.

Fifthly—It acts as a guide in digestion by flowing readily when we are hungry, see or smell something that we desire to eat.

Sixthly—It helps us to secure enough fluid food by indicating through its decrease in secretion the sensation of thirst.

Seventhly—It is a cleansing agent for all the tissues and the teeth, which makes it very valuable as a safeguard to health.

Although the saliva is ninety-nine and one-half

per cent. water, by means of the salts and ferment it contains, its action is a most important one, making it altogether a wonderful fluid.

The next members of the oral cavity, last but not least, are the teeth. The teeth are specialized hardened organs, situated in the softened portion, or alveolar process, of the jawbones, whose chief function is to aid in mastication of food. Of jawbones in which the teeth are lodged we have three, two above which are immovable, and one below which is movable.

Most animals possess teeth varying in form, function and number, according to the peculiar needs of the individual animal. Some animals possess teeth for the purpose of preying upon other animals; some for purposes of seizing vegetable material for food. The former of these are called carnivora, or flesh-eating animals, and the latter are called herbivora, or vegetable-eating animals. We ourselves, who belong to the type of animal whose scientific classification is in the Latin language genus *homo*, or man, are a combination of these two types. That is, we eat both animal and vegetable food, and are therefore called omnivorous, which is derived from the Latin *omnis*, all, and *voro*, I eat. Some of our teeth are for

crushing, cutting and grinding vegetable food, while others are for seizing, tearing, cutting, grinding and crushing animal food.

Man, like many other animals, possesses during a lifetime two sets of teeth; one for early infancy and childhood, which are called temporary or deciduous teeth, and another set replacing

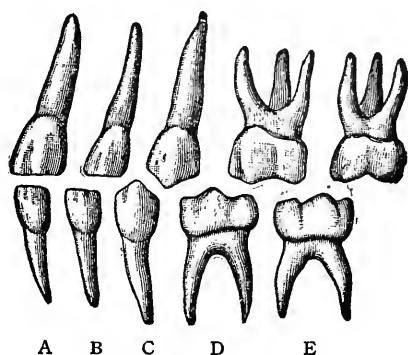


FIG. 1.—Temporary Teeth, Left Side. (Burchard)

- | | | |
|--------------------|--------------------|-----------|
| A. Central Incisor | B. Lateral Incisor | C. Cuspid |
| D. First Molar | E. Second Molar | |

these and serving until old age, named permanent or secondary teeth. In the temporary set we have twenty teeth, in the permanent set thirty-two, making fifty-two in all.

For purposes of scientific classification each set is given a dental formula, that is, an equation representing the kind, number and relative position of the teeth in each set.

The dental formula for the temporary set is as follows:

$$\begin{array}{c} \text{I} \quad \frac{2}{2} \quad \frac{2}{2} \\ \text{R} \quad \text{L} \end{array} \quad \begin{array}{c} \text{C} \quad \frac{1}{1} \quad \frac{1}{1} \\ \text{R} \quad \text{L} \end{array} \quad \begin{array}{c} \text{M} \quad \frac{2}{2} \quad \frac{2}{2} \\ \text{R} \quad \text{L} \end{array} = 20$$

The meaning of this equation is as follows:
I, or incisors, two above and two below on each side of the median line or middle of the face,

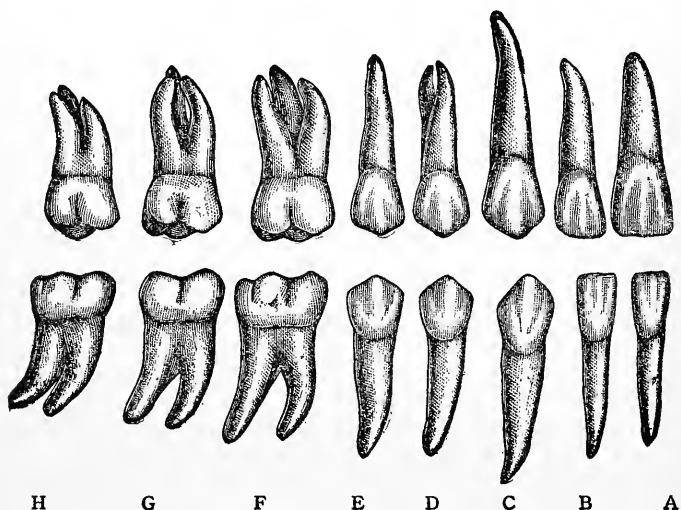


FIG. 2.—Permanent Teeth, Right Side. (Burchard)

- | | | |
|--------------------|--------------------|----------------|
| A. Central Incisor | B. Lateral Incisor | C. Cuspid |
| D. First Bicuspid | E. Second Bicuspid | F. First Molar |
| G. Second Molar | H. Third Molar | |

called central and lateral incisors. C, or cuspids, one above and one below on each side of the median line. M, or molars, two above and two below on each side of the median line. Making twenty

in all, or, in other words, on each side, both right and left of the upper jaw, are five teeth, making ten above; on each side of the lower jaw are five teeth, making ten below, and both jaws together hold, therefore, twenty teeth.

The dental formula for the permanent teeth is as follows:

$$\begin{array}{ccccccc} \text{I} & \frac{2}{2} & \frac{2}{2} & \text{C} & \frac{1}{1} & \frac{1}{1} & \text{B} & \frac{2}{2} & \frac{2}{2} & \text{M} & \frac{3}{3} & \frac{3}{3} = 32 \\ & \text{R} & \text{L} & & \text{R} & \text{L} & & \text{R} & \text{L} & & \text{R} & \text{L} \end{array}$$

In this formula we note the letter B, which stands for bicuspid, adding two more teeth on

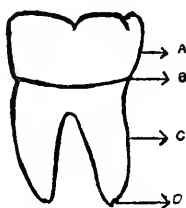


FIG. 3.—External Appearance of Lower Molar

A. Crown of Lower Molar B. Neck C. Root D. Apex of Root

each side of the median line both above and below; and we also note three molars on each side, above and below, instead of two as in the temporary set. In the second set the incisors and cuspids take approximately the same place as the corresponding teeth in the temporary set, and the bicuspid or premolars occupy the place formerly held by

the temporary molars, there being no temporary bicuspid. The permanent molars gradually appear behind the position held by the second temporary molars.

Each tooth has certain characteristics common to all of the teeth; that is, each tooth has a crown, a root or more than one, neck and pulp cavity.

The crown is that portion of the tooth covered with enamel, and able to be seen projecting beyond the gum.

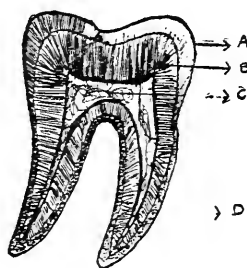


FIG. 4.—Internal Appearance of Lower Molar

A. Enamel of Tooth B. Dentine C. Pulp D. Cementum

The root is that portion of the tooth covered with cementum and placed in the jaw-bone, being hidden by the gum or that portion of the mucous membrane surrounding it.

The neck is that portion of the tooth which is constricted at the junction of cementum and enamel, joining the crown and the root.

The pulp cavity is a hollowed cavity within the crown and the root containing the pulp. It may be subdivided into pulp chamber, or that part of the cavity within the crown, and the pulp or root canal, or that part within the root, one being continuous with the other.

These are termed the anatomical divisions of the tooth. Again, we find that these anatomical parts are themselves made up of particular kinds of cells and tissues, five in number.

The crown of the tooth is covered by a tissue called enamel, which is the hardest substance in the body. The enamel is composed of two kinds of material, one of which is inorganic, the latter not possessing the structure of living tissue cells, but composed of various salts comprising minute tubes called enamel rods, which are held together by other softer, cellular, vital or organic substance almost negligible in quantity. Besides, water is present, like in all tissues. The enamel of adults is denser than that of children.

The root of the tooth is covered by a bony substance called cementum, which in many ways resembles bone. It is about two-thirds inorganic and one-third organic, and, like enamel, is thickest in adult life. It is closely connected with the den-

tine within the root, and meets the enamel at the neck of the tooth.

Externally to it is the pericementum, which is a fibrous tissue that connects it with the jaw-bone or alveolar process, in which the root is placed. It is this tissue that supplies the tooth with the sense of touch.

The dentine comprises the bulk or body of the tooth, that is, all of the solid portion of the tooth beneath enamel and cementum. While not as hard as enamel or cementum, it is harder than bone. It is about two-thirds inorganic and one-third organic in structure, and contains very fine little tubes, called dentinal tubules which run from beneath the enamel and cementum into the pulp. It is yellowish-white in color, and upon its color and the translucency of the enamel is the general shade of the tooth dependent when in a healthful condition; as a rule, the darker the dentine the darker the tooth.

Within the pulp cavity we find a small amount of organic tissues consisting of minute blood vessels, cells and nerves, but which is erroneously spoken of as the "nerve," because of the idea that a dreadful pain will result when the pulp is touched or irritated, consequently the result of the

misbehavior of the "live nerve." The pulp, through its blood vessels, gives nutrition to the tooth, and by means of its nerves supplies the tooth with a messenger of warning in case of danger. However, if we were to touch a healthy pulp in perfect condition and not irritated by any external means, no pain would result whatsoever.

The temporary teeth in many ways resemble permanent teeth. There are, however, some differences. Firstly, and most marked of all, they are much whiter; secondly, their enamel is coarser; thirdly, the constriction of the neck is more marked; fourthly, they are smaller than the corresponding permanent teeth; and lastly, their roots spread farther apart to allow for the crowns of the incoming permanent teeth.

The reason we have fewer temporary than permanent teeth is that our jaw-bones are not fully developed enough to hold any more, because nature molds the structures of the body in accordance with our needs, and as the temporary teeth are only in our mouths during the first twelve years of life, approximately speaking, they are sufficient to meet our needs for those early years.

When infants get their first little teeth we speak of this usually as "teething," although the

proper term would be eruption of the teeth. By that we mean the process in which the teeth, with their crowns fully formed and their roots partly formed, come through the gums.

Temporary or primary dentition occurs between the ages of five to thirty-two months, the lower teeth usually preceding the upper teeth in the following manner:

Central incisors	5 to 8 months
Lateral incisors	7 to 10 months
First molars	12 to 16 months
Cuspids	14 to 20 months
Second molars	20 to 32 months

Of course these ages may vary in different individuals.

As nature does not desire our temporary teeth to remain very many years, she starts to build our second teeth while the first ones are yet in place, and when we are old enough to have our second teeth she paves the way for them by gradually shortening their roots, by what is termed the process of resorption, in which they gradually disappear. This is why, when we are about to get our second teeth, our first ones become loosened through the lack of support. On the other hand

should they have been so badly decayed as to have been "dead" teeth or teeth with a dead pulp, root resorption does not occur. As we gradually lose all our first teeth our jaw-bones are developing in width, depth, and length, so as to be able to accommodate the wider, longer, larger and more numerous permanent teeth, at the same time growing in harmony with the other structures of our body.

Although our teeth are erupted at the ages previously given they are not yet complete, but keep on forming from neck downwards until the entire root, to the end or apex, is built up, the latter part being the last to be finished. About a year after the complete formation of the temporary teeth the process of resorption begins and, as explained, the first teeth are lost to give place to the succeeding permanent teeth. First the central incisors, then the lateral incisors, next the first molars, then the second molars and, lastly, the cuspids are lost, each one being immediately succeeded by a permanent tooth.

Secondary dentition starts at about the sixth year with the appearance of the first permanent or six year molars which arise directly behind the temporary second molar. An approximate table

for the eruption of the permanent teeth is as follows:

First molars.....	5 to 7 years
Central incisors.....	6 to 8 years
Lateral incisors.....	7 to 9 years
First bicuspid.....	8 to 10 years
Second bicuspid.....	9 to 11 years
Cuspids	10 to 12 years
Second molars.....	11 to 13 years
Third molars.....	17 years or later

The third molars or wisdom teeth are frequently absent or may be held back in the jawbone through lack of room to erupt or other reasons not necessary to be discussed here. However, we see that at the age of seventeen not alone have we lost all our temporary teeth, but we may have our complete set of permanent teeth, including the third molar.

Let us now consider the various functions of our teeth. Firstly our teeth, because of their various shapes and positions, have individual work to do in mastication.

The incisors are used for cutting or incising food; that is, after the food is in our mouths we

use the incisors to divide it into smaller portions. Each incisor has one root.

The cuspid is our most prehensile tooth, that is, it is best adapted to seizing and tearing animal food, resembling the teeth always present in flesh-eating animals. It also has one root, which is the longest and strongest of any in the mouth.

The bicuspid, or premolars as they are sometimes called, derive their name from the fact that they have two cusps. They are smaller than the temporary molars and in this way allow for the increased space needed by the permanent cuspids, which are larger than the temporary cuspids and erupt after the bicuspid are in position. Some bicuspid have two and some one root. Their function is to divide the food into small pieces and prepare it for chewing by the molars.

The molars vary more than any of the other teeth in size, form and function, having four cusps or more, and two or more roots, according to their situation; usually two when in the lower and three or more when in the upper jaw. These cusps, by catching the food between them when in contact with the cusps of the teeth in the opposite jaw, grind and crush it, as a final step in its mastication.

The functions of the temporary teeth resemble those of the similar teeth in the permanent set and do not need any separate explanation.

Knowing now the elementary facts of the teeth individually we should glance at them collectively. If they are arranged in a regular manner, that is, speaking of the permanent set, they form in each jaw a rounded curve or ellipse, that of the upper jaw being a little rounder than the lower, so that the upper teeth slightly overlap the lower teeth and are so arranged that all of the upper or biting surfaces come into contact with those of the opposite jaw, thus perfectly allowing for the thorough mastication of the food to assist in digestion. Every tooth in each jaw meets two teeth in the opposite jaw, with the exception of the upper third molars and lower central incisors. This is plainly shown in the illustration (Fig. 5).

Besides the function of the teeth in mastication they serve us in speech, and by their relationship with the lips, tongue, cheek and palate make possible the formation of various sounds, or vocalization.

Knowing, then, these elementary facts concerning the healthy oral cavity, we will look at it from another standpoint, that is, we will next

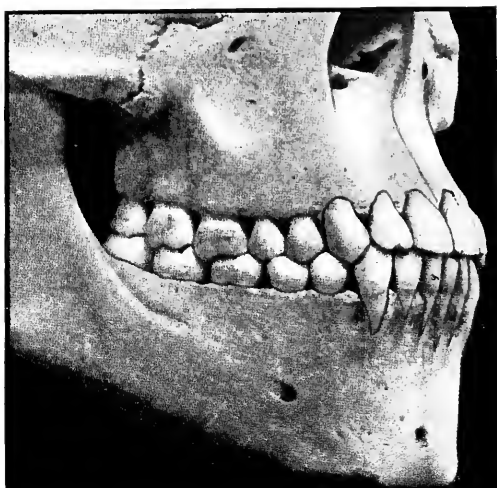


FIG. 5.



glance over some results of its unhealthful condition and by observing the effects of neglecting the mouth and teeth, help emphasize upon our minds the absolute necessity of oral hygiene.

CHAPTER IV

RESULTS OF NEGLECTING THE CLEANLINESS OF THE ORAL CAVITY

WE often hear people speak of decayed teeth, but hardly ever stop to think of their evil consequences. Let us see what happens when a tooth becomes decayed and how it is brought about.

If a person were to eat a meal containing some sugary or starchy substance, the latter would be acted upon by the saliva, which would convert it into glucose, as we previously remarked, and in all probability if the oral cavity were not thoroughly cleansed after eating, some remnants of this glucose would remain between the teeth or be held by means of a gluey substance in some pit or crevice of the tooth. Now in our mouths are always present hordes of microscopic bodies or germs, amongst which are a kind called bacteria, whose ability to flourish and grow is due to the presence of heat, moisture and food remnants, always found in the oral cavity. One of these bacteria, called the *bacillus lactis*, or lactic acid forming germ, always occurs in large number, so

that when it finds the glucose to feed upon it causes a fermentation, or chemical change, by the formation of two parts of lactic acid from one part of glucose. Lactic acid, when present, is the active cause of tooth decay, and it first acts upon the enamel, seldom attacking the root of the tooth because the latter is guarded by the gum which surrounds it. When the lactic acid, after being formed, accumulates upon the enamel, it eats away

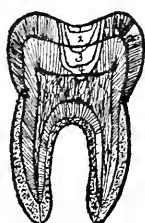


FIG. 6.—Progress of Dental Decay

- | | |
|-------------------------------|-------------------------------|
| 1. Superficial Stage of Decay | 2. Progressive Stage of Decay |
| 3. Deep-seated Stage of Decay | 4. Complicated Stage of Decay |

or dissolves the salty or inorganic material of which we spoke in the preceding chapter. However, in order that the process of decay may continue, another kind of micro-organism is necessary to destroy the organic or albuminous part of the enamel. This is done by what are called saprophytic bacteria or germs that live on decomposing organic tissues. Thus, after the lactic acid

starts the destruction of the enamel, the saprophytic germs complete it. This beginning of decay in which the enamel is destroyed, is called the superficial stage of dental caries, which latter word means decay.

The next stage of decay involves the dentine. The process of decay goes on in the same manner, except that more of the dentine is organic than the enamel, and therefore the saprophytic germs play a more important part than in superficial decay. It is at the beginning of the progressive stage of decay, as it is called, that we have most pain, because when the very ends of the dentinal fibres (in reality fine extensions of the nerves in the pulp) which lie beneath the enamel are irritated, they respond by causing intense toothache, due to the fact that the extreme end of a nerve, or its extension, in this case the dentinal tubule, is its most sensitive portion. However, it must be remembered that the dentine does not contain any real nerves, but by means of its thread-like processes acts as the messenger between the enamel and the pulp.

Naturally when our teeth decay, we start to have pain, and are thus warned to have the teeth affected properly treated by our dentist in order

to avoid further decay: and of this necessary procedure we shall speak later.

The decay may go still further if treatment is neglected so as to almost reach the pulp, when, because of its deeply inward penetration, it is spoken of as deep-seated or third stage of caries.

If, however, the disease goes on unchecked, the pulp is involved and we then find the decay has reached the last or complicated stage, at which time we usually have to sit up and take notice. This is well known to any one who has been unfortunate enough to have had an aching pulp or "exposed nerve."

As we have now traced the process of decay to the pulp which leaves a destroyed portion of tooth or cavity of decay behind it, let us next see what this may result in.

Let us suppose that the second temporary molar of a child four years of age becomes decayed: if this tooth is then neglected the decay goes still further, which means that sooner or later the little child will have a severe toothache. But suppose, as is usually the case when neglected, that the toothache is so bad and the decay so far advanced as to necessitate the loss of the tooth. The pain is relieved, but what happens?

The loss of the temporary molar will eventually affect the permanent teeth in this manner. Under ordinary circumstances, the first of the second set of teeth, or six year molar, would come through the gums at the age of six years and assume its correct position immediately behind the second temporary molar. But as there is now an unfilled space created by the loss of this temporary tooth, the permanent molar having no resistance in front to keep it in its proper position, soon starts to move forward into that space created by the removal of the temporary molar, which latter tooth should have remained until the age of ten, when the second bicuspid would replace it. This is only the beginning of trouble, for when the bicuspid is ready to take its correct position, the molar, having moved forward, crowds it out of place. And again at the age of twelve, when the second permanent molar erupts, it does not keep its proper place, but moves forward into the space caused by the tilting of the first molar, thus making a continuous chain of irregularities. Still we are not yet finished, for in the meanwhile the upper permanent second bicuspid and molars on the same side have erupted, and, as previously explained, should so meet or occlude with their lower

opponents or antagonizing teeth as to evenly meet their upper surfaces. However, as the lower teeth have become irregularly placed, this valuable function is lost and the power of mastication by all the teeth in the irregular region is almost entirely destroyed, because the cusps and biting edges of the opposing teeth are thrown out of their correct relative position.

Thus we see the result of neglect of a temporary tooth upon the permanent set. Not alone is mastication interfered with, but, consequently, digestion, because if our food is not properly chewed, a greater task is thrown upon the rest of the digestive organs, principally the stomach, which may be injured by having to do the work of mastication or division of the food which nature never intended and which should have been done by the teeth. Furthermore, from the age of four, at which the temporary molar was extracted, to the age of ten, when the bicuspid taking its place arrives, the child is missing one tooth to aid in mastication and speech, which early adds to the harm done by the irregularities succeeding its removal.

In order to emphasize the sad results of neglect of the temporary teeth, let us observe some other

occurrences, following the loss of the temporary molar which we have taken for an example.

When the permanent teeth become irregularly placed or crooked, as we traced their movements before, they cause a loss of the correct appearance of the lips, cheek and face as a whole by interfering in their actions and proper outline.

And again if the permanent molars are not correctly placed in the jaw-bones, but move forward, the bone behind them receives no stimulus or impulse to develop properly, and so does not grow in harmony or proper relationship with the other structures about the mouth and face.

Having used the first permanent molar as example, we should more fully consider its importance. The six-year molar, as it is ordinarily called because of the age at which it usually erupts, is perhaps the most neglected and diseased tooth of the permanent set. The chief reason why this tooth is most neglected is that in coming into the mouth it erupts behind the last temporary tooth and consequently because of its posterior position no importance is placed upon it, the idea being that it is only a temporary tooth and will soon be lost. So it is neglected and is often so

diseased, even before its roots are completely formed, that its removal is a matter of compulsion.

Why is the six-year molar important? Because it is the keystone to the second set of teeth. Allowing that all of the temporary teeth are present, the first molar which always erupts in its correct position will serve as a guide to the proper arrangement of all the succeeding permanent teeth in front of it and behind it. This is because, being the largest and strongest of the permanent teeth, it controls the proper position needed for the permanent teeth by preserving the necessary amount of space to be occupied by those members in front of it; and, as we remarked before, it stimulates the growth of the jaw-bone behind it, to allow for the last molars: besides, by the length of the first molars when in contact, the distance between the upper and lower jaws is determined.

But if this valuable guide is so badly diseased that it must be lost, there then arises a series of disturbances which end up in distorted, ill-looking, improperly arranged mouths and teeth, all of which are reasons for their stricter preservation; while due to the irregularities thus caused may be a more serious condition in which the teeth become so misplaced, crooked or malposed, that the

individual may become unable to properly close his mouth. He then becomes a mouth breather instead of properly breathing through his nose, with a consequent pale look, sickly feeling, anemic hue and unhealthful condition in general, because, instead of breathing correctly through the nose where the fresh air taken in is purified before it enters the lungs, he breathes incorrectly and is virtually poisoned by having to take into his body by way of the mouth all those foreign substances which otherwise would have been removed and which greatly lower the value of the air he breathes in and deprive the tissues of its purity.

Let us now consider what happens when a badly decayed tooth, or one in which the pulp has been reached by decay, is neglected in spite of nature's warning of pain. After a short time, especially if a large cavity is present, allowing various germs in the mouth to enter into the pulp cavity, the tissues of the pulp decompose, due to the action of the saprophytic bacteria, which live on decomposing tissues, and which, with the aid of other harmful germs present, give rise to the formation of foul gases and poisonous products, all of which may result in what is called an alveolar or dental abscess. We then have a devitalized or dead tooth

which is accompanied by intense pain and swollen features. Not alone do we have to suffer, but our daily tasks are interfered with and our health undermined. We surely now seek proper treatment and if fortunate enough may have the affected tooth restored to a useful condition. However, even if this condition is cured, the tooth, having lost its vitality, is of less value to us than if it were healthy, for these reasons: Firstly, it is more easily decomposed by further decay or broken up by the force of mastication because the pulp, when dead and removed, can no longer supply nutrition to the various internal tissues of the tooth and hence its power of resistance to disease or resistance to crushing stress is lost. Secondly, it loses its crushing power in mastication because the artificial substitute for its decayed structure, or filling, is not as strong as the original tooth structure itself. Thirdly, its roots containing perhaps some decomposed pulp tissue impossible to remove, may be the source of future trouble. Fourthly, it loses its color and becomes unsightly or, if not badly discolored, never has its original natural appearance.

On the other hand not alone may the tooth be affected but sometimes the jaw-bone around it

and even the whole body, through the spreading of the diseased condition, and then we may have blood poisoning, which results very seriously.

Very often, however, a devitalized tooth is entirely neglected and proper dental treatment not sought for because the tooth does not pain. In such a case we are fooling ourselves, because the diseased condition about the root of the tooth still exists, but only in the form of a "blind" abscess, which name is given because of the lack of external signs to give warning of its presence. It would be difficult to appreciate how dangerous such a condition is, and if only to avoid this alone it is worth our while to uphold strictly the cleanliness of the oral cavity. The poisonous germs and their products hidden by the gum and giving no signs of their presence in the mouth may slowly enter into the blood and lymph vessels that pass through that particular area affected and, gaining a foothold, pass with those fluids into other tissues and organs where the diseased condition is spread. This is the greatest unseen danger in neglecting our teeth, and when our bodies are thus a stronghold of disease originating unseen in the mouth, we are in a septic or poisonous condition. Those organs which are not in a strictly healthful con-

dition and, as we say, run down, are the easiest to be thus afflicted, and are made still worse by the presence of the germs and poisonous products coming by means of the blood vessels from the abscessed roots of neglected teeth. In this way we may become victims of such diseases as inflamed joints, for instance, swollen wrists or ankles; deformed joints, in which condition the bones lose their proper functions and positions, resulting, for instance, in lameness; general gout, or rheumatism; kidney disease, stomach disease, liver disease, intestinal diseases, nervous diseases, heart disease and anemia, or lack of healthy blood. Thus we see that our entire body may be affected and our health demolished through the action of an unknown source of disease resulting from neglect and lack of cleanliness.

There is another way in which we may become victims of bodily disease through a neglected decayed tooth. Suppose a child of ten years, in a poor physical condition and possessing an unclean mouth, has a devitalized first molar with a large cavity in it. Now it is possible that some disease germs, for instance, as is most common, the tubercle bacillus or germ of tuberculosis, may be breathed into the mouth and find their way into

the cavity of decay, into the roots, and thence into the blood or lymph. Then the child may be afflicted with small rounded swellings about his neck, which would represent the desire upon the part of the body to fight off the disease and prevent it from going further. But if the child is weak and in poor physical health the barrier fails and the germs get further into the body, where they then in one location or another set up the fateful disease.

Let us turn to still another undesired condition caused by neglected care of the teeth. If during our early years we do not properly cleanse our teeth and do not have them thoroughly cleansed by the dentist himself, as we shall later mention, there arises upon the roots and the crowns a hard accumulation called tartar, which is the result of the unremoved collection of hardened material formed in such a case by the salts in the saliva which clings to the teeth and being undisturbed, remains there. Gradually, sometimes in months and sometimes in years, the tartar grows in amount, forcing the gum from the root of the tooth on which it collects. There is then deposited in the space formed various micro-organisms which cause the formation of infectious matter

and the establishment of a disease called Riggs' disease, or pyorrhea alveolaris. This matter is constantly discharged into the mouth, where it poisons the tissues, disgusts the person afflicted, and in all probability is swallowed. This then results especially in digestive diseases, for instance, when the germs thus swallowed get into the intestines, appendicitis. Besides, of course, the gums gradually leave the roots of the teeth, the bony support is destroyed and the teeth then drop out or are hopelessly loosened, thus depriving us of important structures both in the preparation of food for digestion and speech.

Having generally considered the evil results of decayed teeth we will turn our attention to the mouth as a whole, for we have said there are present constantly here germs of all description no matter how healthy the mouth, and these micro-organisms, together with the food remnants, dead tissue cells and mucous or cellular discharge, make an ideal breeding-place for disease.

Therefore if no measure of cleanliness is carried out to remove these unhealthful deposits as thoroughly as we can, the following conditions may result:

Firstly: The presence of disease germs which

are allowed to grow freely may be so numerous as to result in their being swallowed, thus resulting, if the individual is run down, in a general disease, as, for instance, typhoid fever.

Secondly: They may cause an inflammation of the gums, cheeks, lips, tongue, tonsil, palate or throat by their irritant action.

Thirdly: They may act upon the food particles and cause their decomposition, resulting in the formation of foul gases with a consequent bad odor and taste.

Fourthly: They may be swallowed with food particles, thus interfering with the healthy action of digestive organs, consequently ending with impaired nutrition or improper feeding of the body cells and tissues.

Fifthly: Various coloring germs may become imbedded in the enamel of the teeth, thus causing them to take up unsightly stains.

Sixthly: At night, if abundantly present, the zymogenic micro-organisms will produce a decidedly acid condition, thus serving as a helpful agent of decay, for it is now that the saliva loses its alkaline or anti-acid properties and is least able to fight off the lactic acid that is at this time so freely formed.

Seventh: It is in the oral cavity that the very factors in tooth decay are present, and unless always on our guard, the lactic acid will be formed in alarming quantity.

As it is much easier to prevent all of these conditions mentioned, both in regards to the teeth and the rest of the mouth, than to cure or relieve the diseased conditions when present, let us see how this may be done and how all dangerous sources of ill-health in the oral cavity may be removed or at least lessened, and for this very purpose we will turn to discuss those measures which, if honestly carried out every day of our lives that it is possible to do so, will greatly add to our own comfort and progress and consequently the improvement of the whole community in which we live.

CHAPTER V

MEASURES OF ORAL HYGIENE

THE first thing to consider in studying the measures or duties of oral hygiene is our purpose in following out these procedures, or, in other words, to have a full understanding of what is to be attained in preserving the healthful conditions of the mouth and teeth. In the first chapter we explained the meaning of oral hygiene, in the second chapter we described briefly the healthful working of our bodies in general in order to appreciate the relationship between the oral cavity and the rest of the body. We then described the uses and functions of the structures in the mouth, and in the preceding chapter we observed the evil results arising from neglect of the proper care of the entrance to our body. Thus we have discussed the healthful and unhealthful aspects without going into a too detailed or technical account. In other words, all that has been said before helps us to understand the end or purpose to be achieved, by showing us, firstly, in a positive manner, the conditions to be desired in health; and secondly,

in a negative manner, the conditions to be avoided by strict attendance to the proper care of the mouth and teeth; and now we shall show the means to the end by explaining the duties to be carried out in order to attain our object.

The measures of oral hygiene may be divided into four groups:

First: Local, or most important, depending entirely upon ourselves.

Second: Dietary, relating to the food we eat.

Third: General or considerations concerning our bodily welfare as a whole.

Fourth: Unfailing periodical examination, prophylactic and all other necessary treatment by the dentist.

All of those measures proposed to prevent disease are called prophylactic, and those procedures necessary to prevent or diminish diseased conditions of the mouth and teeth are considered under the term of oral prophylaxis, the most positive and successful measure of which is described by one word—cleanliness.

Local measures: In describing this part of our prophylactic program we have to consider, firstly, what must be done in order to obtain a constantly clean set of teeth, so that the chief factors con-

cerned in producing decay of the teeth, namely, the lactic acid bacteria and their food, starchy and sugary remnants; and the saprophytic bacteria with their means of subsistence the albuminous remains of the food we consume, are thoroughly removed or at least almost wholly so. Secondly, we must consider the constant use of an antiseptic fluid or other form of mouth wash as the individual case requires, in order to keep the various germs, and other undesired substances which are present in the mouth, under at least temporary control.

Dietary regulations: The relationship of our food to the progress of healthy teeth is an important one. We must give brief consideration to the fact that many foodstuffs are the source of trouble in the oral cavity and we should in a few words tell why we must avoid the accumulation therein of any such food particles remaining unswallowed.

General measures of oral hygiene bring into consideration observation of those factors which tend to make the body as a whole more healthy and therefore help to elevate indirectly the healthful condition of our mouth and teeth.

The absolute necessity of having the oral cavity rigidly supervised by our dentist is undisputed

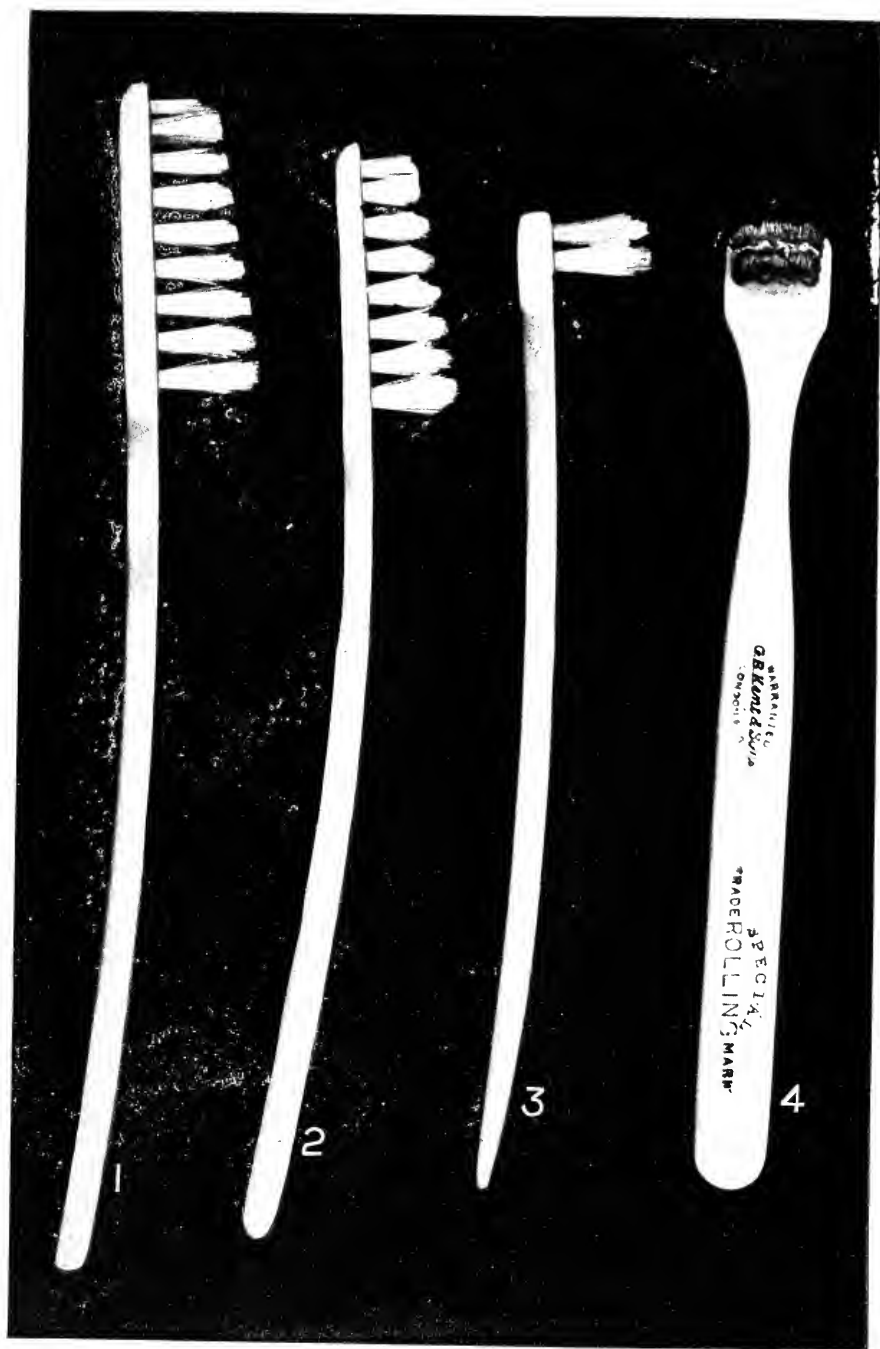
and to-day forms a most practical and beneficial measure of oral hygiene.

We will first consider the local measures of oral prophylaxis, starting with the cleansing of the teeth. The most efficient agent at our command for this purpose is the tooth-brush. A tooth-brush is an instrument used to mechanically brush the teeth, consisting of a handle and cluster of bristles, so arranged as to give the most beneficial cleansing action under the conditions and purpose for which it is used, with the least possible amount of injury to the surrounding tissues. The tooth-brush varies greatly in size, shape and material, according to the conditions for which it is used, for no particular kind is used by everyone, since the matter of choice is best left to our dentist, whose advice we should seek in this matter. Some are made for mouths in accordance with the hardness or softness of the gums, others for the purpose of massaging the soft tissues, besides that of brushing the teeth; others for convenience in cleansing according to the locality in the mouth of the teeth to be cleansed; some according to the size, others according to the shape of the teeth, while others upon the very correct principle of conforming the shape of the tufts of bristles to the natural or

rounded arrangement of the dental arch. The handles are of bone, celluloid, rubber, wood or steel, and the bristles made so as to be hard, medium or soft. While some brushes are made in one rigid piece, others have flexible handles, usually of celluloid, which are not always as advantageous as the former, because the bristles do not hug the teeth so thoroughly in brushing, having a tendency to spring away, due to the free movement allowed by the flexibility of the handle.

The next question arises as to what is used upon the tooth-brush to facilitate its action in cleansing the teeth. We have at our disposal pastes, powders and soaps to be used in conjunction with the tooth-brush, whose principal purpose is to assist the latter by mechanically removing accumulations gathered upon the teeth. It should always be borne in mind that any substances in a preparation for use on the tooth-brush, placed therein for other purposes besides cleansing action, as, for instance, for antiseptic use, are of little value, because they do not remain long enough upon the teeth to exert any such influence. (See accompanying plates.)

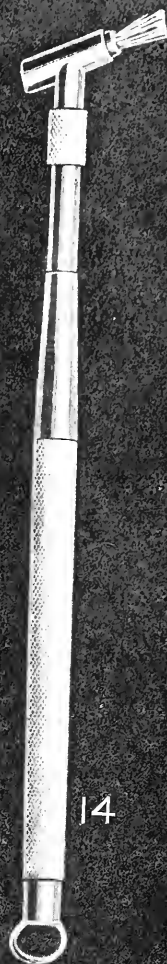
Generally speaking, these preparations should not be of gritty form, for in such a case the enamel would be destroyed by the coarseness of the prepa-



These photographs of various tooth brushes were obtained by permission of The Consolidated Dental Manufacturing Company, New York, through the courtesy of Dr. R. Ottolengui, Editor of *Dental Items of Interest*, in which Journal they were originally published.









ration used; they should not contain fermentable substances which might injure the teeth, and they should be free of staining chemicals, whose effect would be to discolor the teeth; above all, they should not be actively acid in character.

The materials mostly used in these preparations are precipitated chalk, or calcium carbonate, finely ground magnesium carbonate prepared from oyster shells, cuttlefish bone and orris root, while ground pumice stone, borax and oxide of tin are more especially used by the dentist because they are too coarse for every-day use.

Tooth powders, while usually white, may also be obtained colored. Some powders may be used alone, as, for instance, precipitated chalk, while others are made consisting of more than one ingredient, whose basis is usually one of the substances mentioned above.

Pastes which are made by the use of glycerine or gelatine usually have precipitated chalk as a basis and often contain soap in conjunction with various other substances. While these do not have the brushing power of powders, which are coarser than pastes, they are usually pleasant to use and practical, as they may be distributed evenly upon the brush.

Soaps consisting of various powders combined with castile soap have the advantage of removing fatty accumulations from the teeth, and if pure and not overused, give beneficial results.

In this book we purposely refrain from mentioning particular tooth-brushes or cleansing materials, because this advice is best given by the dentist; but the makers of these materials whose preparations are recommended by the dentist usually give their earnest efforts in perfecting those articles, so that we may accept them with security.

Knowing now what we have at our command to clean the teeth with and assuming that we have the average healthful condition of mouth and teeth, let us see how we should use the tooth-brush so as to obtain the most efficient results.

Firstly: Brush the teeth after each meal if possible, but especially before retiring at night and upon arising in the morning.

Secondly: Keep the brush clean by rinsing it when finished using and deposit it in a clean, dry place, preferably within a closed container.

Thirdly: Before applying the dentifrice or tooth preparation, wet the bristles slightly, but no more, or else the bristles become soft, flabby and worse than useless. Apply the dentifrice evenly

over the bristles, so as to assist in its equal distribution to all of the teeth, making one application for the lower teeth and another for the upper.

Fourthly: Firmly grasp the handle and with a vigorous wrist action brush all the surfaces of all the teeth as thoroughly as possible; at the same time brush slightly the gums and soft tissues immediately about the roots, so as to massage and stimulate them; but do this with precaution or else they may be injured.

Fifthly: Never brush the teeth crosswise, but use a circular motion whenever possible. Brush the lower teeth upwards from the gums to the biting edges and then carry the bristles over their upper surfaces, especially in the region of the bicuspid and molars, where the food remnants tend to accumulate. Brush the upper teeth downwards from gums to biting surfaces, being sure to cleanse also the masticating surfaces of these teeth. Be sure to brush every surface of every tooth.

If we want to be surest of the correct way to use the tooth-brush, this advice will be given most readily by our dentist, from whom we may best learn how to practically carry out the fundamental principles we thus far have outlined.

The most efficient means of removing any food

remnants between the teeth not brushed away is by the use of dental floss silk. However, in using this floss silk we must do so with precaution, so as not to injure any of the soft tissues. After taking a piece about six inches long, it is firmly grasped with the thumb and index fingers of each hand in such a manner as to have these fingers of one hand within one inch of the same fingers of the other hand, so as to firmly grip the floss silk and prevent it from slipping. It is then carefully passed between each of the teeth, drawing it through the spaces between them, starting from the last tooth on one side and ending with the last tooth on the other side. This must be done in a gentle manner, as the gum tissue between the teeth is quite sensitive and easily injured. This procedure after each meal will greatly add to the removal of all food débris not already removed by the tooth-brush, and it will at least assist in cleansing the teeth if it is not possible to use a tooth-brush.

Tooth-picks of wood are best left unused, because their continual application injures the gums. However, the occasional use of a clean tooth quill, if carefully applied, is permissible.

Amongst local measures, the next most impor-

tant weapon of oral prophylaxis is the mouth-wash. As this subject in itself might give rise to the writing of a small book, let us see the importance of the use of a mouth-wash. If we recollect, we mentioned previously the fact that there are ever present in the mouth various germs, amongst which were some whose activity in the presence of unremoved food particles gave rise to dental decay, and others which also were factors in the progress of that disease. In using a mouth-wash our chief purpose is to counteract the growth and evil results of these micro-organisms, and at the same time exert a general cleansing action upon all of the oral tissues. These results are brought about by a mouth-wash or medicated fluid which is of a neutral or alkaline reaction, in the following manner:

Firstly—It may neutralize any acidic condition present in a chemical way, by paralyzing the acid reaction.

Secondly—It will temporarily hinder the growth of these germs, and in some cases destroy them.

Thirdly—It will wash away any food remnants from surfaces of the teeth inaccessible to the tooth-brush or dental floss.

Fourthly—It exerts a cleansing action upon all of the tissue with which it comes in contact in the oral cavity, every nook and corner of which under ordinary circumstances are breeding-places for these hordes of invisible enemies, many of whom do not sympathize with us, but are ever ready to foist their evil results upon our bodies.

Fifthly—It helps to remove unpleasant tastes and odors from the mouth.

The most efficient and satisfactory mouth-wash is our own healthy alkaline saliva, and happy indeed would be the one who were fortunate enough to artificially duplicate it in composition and action.

Mouth-washes may be simple, containing one element, or compound containing more than one, most of which latter are prepared for the public in practical and beneficial forms. These are called antiseptics, meaning that they tend to prohibit the further growth of the micro-organisms with which they come in contact, especially the saprophytic germs.

Simple washes, as lime-water, bicarbonate of soda, or salt water, are inexpensive and often used to advantage. However, the selection of a mouth-wash, like tooth-brush and dentifrice, should be

left to the dentist, who can best determine what is the most suitable form according to the conditions present in the individual oral cavity, for some mouths are different than others.

The time to use a mouth-wash corresponds with that of the tooth-brush, placing especial emphasis upon its use on arising in the morning and before retiring at night, for during the latter period our saliva is least resistant to the acid condition prevalent at that time.

It should be so used that at least half a glassful of water must be added to the amount used for each rinsing, in order to obtain the desired action and sufficient volume of fluid. When taken into the mouth, preferably lukewarm, the solution should be forced, by action of lip, cheek and throat muscles, into all the crevices and surfaces of the mouth and throat, and particularly over and between the teeth. We should try to gargle these fluids and thus obtain their full benefit, and we must always spend at least one full minute in using such a cleansing fluid.

A final accessory in oral prophylaxis, regarded more as a luxury than a necessity, is the tongue scraper, which, as its name implies, is an instrument made to remove accumulations from the

tongue that are often found there upon arising in the morning, or when our digestive organs are not in the best of health.

Dietary measures: It is important for us at the present time to understand some essential part of this interesting subject. As we may already know or may perhaps study later from other sources, the food we consume is divided into several groups: these are the albumins, or tissue builders, carbohydrates and fats, or heat creators, inorganic salts and water. These five foods are absolutely necessary to sustain life, and must be in every person's diet.

As far as this discussion is concerned, our chief interest lies in the carbohydrates and albumins and their relationship to the progress of the mouth and teeth.

One great dietary mistake with us to-day, especially with children, is the overuse of sugary and starchy foods and delicacies, as cakes and candies. We previously referred to the fact that such substances, for instance, grape-sugar, cane-sugar, fruit-sugar, starch and gum, are acted upon by the saliva with the formation of glucose, a simple form of sugar, and we noted the result of the action of the lactic acid bacteria upon these food remnants

of glucose with consequent production of decayed teeth. Therefore we must appreciate this condition and take practical advantage of what it teaches us; in other words, we must restrict ourselves in the use of such foods, and, above all, try to sacrifice for the sake of our health at least some of these various sweets, which while very tempting are danger in disguise.

The albuminous foods, as, for instance, meat and eggs, are also elements of danger if not removed in a thorough manner, for it is upon these that the saprophytic bacteria flourish and cause their decomposition into foul gases which give us usually disgusting taste and discomfort, and also cause the origin of odors making our presence unagreeable, to say the least, to those about us.

One more important point in regard to our food is demanded, and it is this: we must thoroughly chew every morsel which we take into our mouths and we must exercise fully all those functions which our teeth execute, not alone to better prepare the food for digestion, but by developing the movements of mouth, jaws and teeth, to stimulate these tissues and aid in their healthful development.

General measures: We now come to those

general prophylactic considerations which, when carried out, indirectly assist the healthy oral cavity, by aiding us to maintain good constitutional physique, or, in other words, preserve the health of the whole body. While more fully considered under general hygiene, we may, however, briefly note that it is to the best of our physical welfare to indulge in out-door exercise in pure air, secure sufficient rest, eat wholesome food and wear proper clothing, live in well-ventilated rooms and assume clean and good habits, all of which are amongst those necessities of good living, healthy bodies and hence healthier mouths and teeth.

While we must chiefly help ourselves in carrying out all these measures thus far outlined, it evolves upon us as a final duty in our program of oral hygiene to unfailingly observe the following statement: Everyone of us interested in the health of the mouth and teeth must visit a dentist at least once every six months for the purpose of securing all that necessary supervision, advice and treatment which we are unable to carry out ourselves. For no matter how perfect our hygienic efforts, there are several measures, which, because of our lack of professional knowledge and skill, we must for our own benefit have performed by our dental

adviser. The most important of these we will now mention.

Firstly: Starting at the age of three years or six years at the latest, we should secure the advice of a dental adviser in regard to the best means of preserving the health of our mouth and teeth. Our dentist will then start us on the road to oral health and advise us, according to the conditions he finds present, as to the exact way in which we should carry out our personal every-day prophylactic treatment. Furthermore, even if some of us were unable to have received professional supervision at such an early age, we should at our first opportunity secure such advice, for it is never too late to mend. One thing is certain, we must never wait to have pain before we seek the dentist, for in such a case we will be much worse off than if we had properly learned to avoid it, as it will always be true that prevention is the best cure.

Secondly: No matter how thoroughly we carry out our measures of personal oral cleanliness, it is an absolute necessity to periodically secure professional prophylactic treatment; in plain words, the dentist should thoroughly clean our teeth at least twice a year. We previously mentioned that there is constantly forming about our teeth a sali-

vary deposit called tartar, even when in the best of health. Now although we may thoroughly cleanse our teeth each day, there is sure to be a certain amount present, which, through our lack of proper instruments and skill to use them, has not been removed, besides which, perhaps, the teeth may have taken up a disagreeable green or yellowish stain. Surely these deposits must be removed, for if allowed to accumulate the result is that sooner or later we are victims of sore and bleeding gums, foul breath, disagreeable taste and loose teeth, all of which we previously spoke of as a disease termed pyorrhea. So we must secure this treatment every six months by the dentist who, with especially devised instruments and cleansing materials, is best qualified to do that which we ourselves cannot do.

Thirdly: The chief work of the dentist is to prevent disease of the mouth and teeth and thus aid in our general welfare. On the other hand, where disease of the mouth and teeth already exists, chiefly in the form of dental decay, he stands ready to check its further progress. We explained before that the ravages of dental decay, by far the most common disease of mankind, were immense, how decay affected these structures and how, when

present, it might lead to serious consequences. We told how personal hygiene would help to prevent such conditions, and now we come to still another preventative, namely, the supervision of our teeth by the dentist. He alone is best able to examine them carefully, so that any vulnerable points, weakened tooth structure, pits, defects or breaks in the teeth may be pointed out to us. And so the small areas of decay, unable to be seen by us because of their hidden location, minute size or failure to give us pain, may be checked before going further, and by perhaps simple dental treatment, save us from those miseries which the further destruction of the teeth affected would result in, if not stopped in time.

Dental decay usually destroys our teeth in such a manner as to make a heavy toll of the very tooth structure itself, with the formation of so-called cavities. This destruction may be checked by instrumental and medical treatment of the teeth affected, the chief object being to remove the decay already present and prevent its deeper penetration, ending with the filling of the cavity or other form of tooth replacement, which restores the original size, shape and function of the tooth affected, It is not our purpose to study dentistry

itself in this little volume, but it should be remembered that whenever treatment can be obtained for the prevention and cure of diseased teeth, there should be no hesitation upon our part in carrying it out, for, bearing in mind all the functions which our teeth serve, we must all agree that it is best to save a tooth in time than lose it when it is too late.

And, even if we must sacrifice some of our teeth, we may in some form or other obtain artificial substitutes which, while far from nature's own work, serve at least some good in restoring to us a means of mastication, improved speech and pleasanter facial appearance. However, this is another subject, for the very object of our discourse is to learn how to prevent such conditions and not how to cure them.

These words are not written to extol the dentist, but surely his work is important; for if we stop a moment to realize how much good he can do us, we will never hesitate to give him our confidence and assistance.

Finally, let us review briefly those measures which we have laid down in our code of oral hygiene in order to impress them upon our minds.

Firstly: Properly use a tooth-brush, dentifrice, dental floss and mouth-wash.

Secondly: Eat few sweets, chew every particle of food thoroughly and carefully, remove any food remnants remaining in the mouth or about the teeth, after each meal.

Thirdly: Preserve the health of the body as a whole, so as to uphold the health of the mouth and teeth in particular.

Fourthly: Visit the dentist at least twice a year in order to secure all of that advice and treatment which we cannot administer to ourselves.

Follow these rules carefully and there will never be cause for regret.

CHAPTER VI

BENEFICIAL RESULTS OF ORAL HYGIENE

NOW that we have outlined the why and wherefore of a healthy mouth and set of teeth, we can fully appreciate the importance of our message in this little book, and meditate upon the necessity of our living up to those measures which have been described, the unceasing fulfillment of which should be a life-long duty.

It has been shown by those making a study of oral hygiene that over ninety-five per cent. of school children are afflicted with dental decay, amongst other diseases, and if these children alone were made converts to our cause, the benefits derived would be inestimable. For it has been found that those children, victims to a large degree of dental ailments, were backward in studies, sluggish in habits, of poor health, and lacked ambition. And it has been proven that these very children, after receiving proper treatment, became better scholars, more active, healthier and more ambitious than they were previously.

Amongst older folks the same holds true. People of various callings, workers of all kinds,

who have been delinquent in their work because of impoverished oral conditions, have, after their teeth were brought back to healthful condition and their mouths made clean, become of more benefit to themselves, and of greater help to those about them.

And so we could go on reciting the encouraging changes thus brought about in glowing terms, but suffice it to say that the beneficial results of oral hygiene cannot be adequately explained by any words at our command.

For, after all, oral hygiene means many things: personal comfort and pride in our healthy mouth and teeth; a cleanliness pleasant to ourselves and our neighbors; efficient mastication and hence proper digestion of our food; better selection of the foods we eat and greater care in the way we eat them; ability to enunciate our words properly; avoidance of all those ills of the mouth, teeth and body in general which cause so much suffering and depression, improved health, cleaner minds, greater ambition, stimulation to greater usefulness to ourselves and those about us; these are some of the things that oral hygiene means, and in these ways it will benefit those who desire to practice it. Do you?

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